



DEPARTMENT OF TRANSPORTATION
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20591

cy 70-28

OFFICE OF
THE CHAIRMAN

June 4, 1970

A70-28

Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Washington, D. C. 20590

Dear Mr. Shaffer:

Our investigation of an in-flight incident, which involved a Delta Air Lines DC-8 after takeoff from Los Angeles International Airport on October 16, 1969, has disclosed a need for the review of maintenance and shop practices of all air carrier operators pertaining to refrigerant condenser fan assemblies, P/N 75B1-609.

The aircraft involved was climbing through 23,000 feet when the crew heard a loud noise and the aircraft began to depressurize rapidly. The cause of the noise and depressurization was the disintegration of the right condenser cooling fan. Pieces of the fan rotor penetrated the fan housing and fuselage structure of the aircraft. This cooling fan normally shuts off after the aircraft becomes airborne. This is accomplished electrically by the positioning of cooling doors and shutoff valves.

Subsequent investigation revealed four discrepancies in the system:

- (1) A microswitch, which is operated by the cooling door, failed to operate.
- (2) The overspeed safety device to prevent excessive rotational speed of the rotor failed to operate.
- (3) Rough machining marks were left on the fan rotor in an area where the balancing holes were made.
- (4) The front shell of the fan housing did not contain the fragments of the disintegrating rotor.

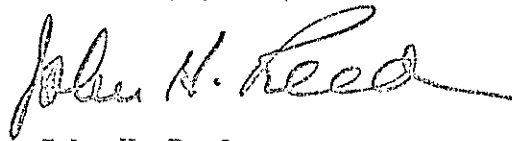
Metallurgical examination of the microswitch revealed that the two internal springs had failed from fatigue. This prevented closing the electrical circuit to the shutoff valve. The cause of the failure of the overspeed switch could not be determined due to extensive damage. Damage to the butterfly type air inlet shutoff valve precluded any determination of valve position. One of many fractures of the fan rotor progressed through the center of four balancing holes. Poor machining of the holes and rough edges were observed.

In order to preclude similar failures, the Safety Board recommends that you consider the following corrective action:

- (1) Require replacement of the microswitch on a periodic basis in all circuitry that controls the operation of the fan assembly.
- (2) Conduct a review of the shop overhaul manuals for proper information on balancing procedures. Definite tolerances should be established for the drilling of lightening holes, such as size, number allowed, spacing, etc.
- (3) Reassess the functional testing of the overspeed switch assembly to assure proper speed cutout.
- (4) Require a thorough examination as to cause of an overspeed trip before a reset is accomplished.

Our staff has discussed this matter with representatives of your Western Region Engineering Staff. If you have any further questions pertaining to this, do not hesitate to contact our staff.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "John H. Reed", with a stylized, flowing script.

John H. Reed
Chairman